**Title 1: Remote Sensing of Surface Urban Heat Islands: Progress and Prospects**

**Abstract:**
Surface Urban Heat Island (SUHI) studies focus on urban heat islands (UHI) investigated with land surface temperature (LST), which can be measured from airborne or satellite-borne sensors. SUHI studies is vital in improving the understanding of the relationship between urban warming and global climate changes, hydrological cycles, and land-atmosphere energy balance. Such studies are also useful for the mitigation of adverse effects of urban heat and the examination of heat hazards and related health issues, the outbreak and propagation of vector-borne diseases, and energy consumption from buildings. Some key science questions arise, including: (1) How can LST data be generated that combine both high spatial and temporal resolution from currently available satellite sensors? (2) How can time-series consistent LST data be generated and used to characterize and quantify SUHI process? and (3) How can the concept of Local Climate Zones be employed to compare and to investigate SUHIs? This lecture examines the state-of-the-art methodologies for generating consistent LST data and the use of satellite derived LST data to analyze SUHIs in selected cities in the North America and Asia, followed by discussion on scientific and technological challenges and future opportunities.

**Title 2: Remote Sensing of Cities: Day and Night**

**Abstract:**
Satellite sensors are inherently different for daytime and nighttime imaging in terms of viewing conditions, overpass time, and spectral and radiometric properties. When the complexity of urban landscapes and the spatial and temporal scales of human activities are also considered, it is highly challenging to combine the daytime and nighttime image data to build a holistic approach to monitoring, measuring, and modeling global urbanization processes and their impacts at various spatial scales. Recent researches in urban remote sensing have shifted the focus from analysis of selected images in a few dates to better utilization of time series images for extracting and interpreting more subtle information hidden in the large volume of datasets. This lecture examines the use of time series imagery of both daytime and nighttime to analyze urbanization and its environmental impacts in global megacities by exploring new methods, techniques, and applications. Three key science questions are discussed, including: (1) How can time series images be used to characterize and quantify urbanization processes? (2) Existing models of land use and land cover changes are not sufficient to characterize and quantify complicated urban land use changes. Can nighttime light image features be extracted to augment daytime imagery in order to map and characterize urban land use trajectories? (3) What are the effects of the urbanization paths on risks, ecosystem services, resilience, and sustainability in the urban areas?

**Short Biography**

Dr. Qihao Weng is the Director of the Center for Urban and Environmental Change and a Professor of Geography at Indiana State University. He received his Ph.D. degree in geography from the University of Georgia in 1999 and previously held an appointment as a Senior Fellow at the NASA from Dec 2008 to Dec 2009. Weng is currently the Lead of the GEO Global Urban Observation and Information Initiative, and an Editor-in-Chief of the *ISPRS Journal of Photogrammetry and Remote Sensing*. Additionally, he serves as the Series Editor of both the *Taylor & Francis Series in Remote Sensing Applications* and the *Taylor & Francis Series in Imaging Science*. Weng has been the Organizer and Program Committee Chair of the biennial IEEE sponsored "International Workshop on Earth Observation and Remote Sensing Applications" conference series since 2008, and is a Co-Lead of Educational Webinar Series of the IEEE Geoscience and Remote Sensing Society since August 2020. Furthermore, Weng served as a National

Director of the American Society for Photogrammetry and Remote Sensing (ASPRS) from 2007 to 2010 and a panelist of the U.S. DOE's Cool Roofs Roadmap and Strategy in 2010.

Weng has been honored with a number of distinguished career awards. In 2008, he received a prestigious NASA senior fellowship. Following this, he received the Outstanding Contributions Award in Remote Sensing in 2011, the AAG E. Willard and Ruby S. Miller Award in 2015, and the AAG Distinguished Scholarship Honors Award in 2020, all from the American Association of Geographers. Furthermore, in 2019, he received the Taylor & Francis Lifetime Achievements Award, and a fellowship from the Japan Society for the Promotion of Science under the JSPS Invitational Fellowships for Research in Japan (Short-term S[E]). The latter is devised for overseas "Nobel laureates or recipients of similarly high-level international prizes with exceptionally outstanding records of research achievements and who currently occupy a leading position in their subject field". Weng was elected a fellow of the Institute of Electrical and Electronics Engineers (IEEE) in 2018, the American Association for the Advancement of Science (AAAS) in 2019, and the ASPRS in 2020.

Weng's research focuses on remote sensing applications to urban environmental and ecological systems, land-use and land-cover changes, urbanization impacts, urban sustainability, environmental modeling, and human-environment interactions. Through the serial invention of innovative techniques, methods, and theories, Weng's research efforts have fostered growth in the geographical and environmental applications of the science and technology of remote sensing. Moreover, his research has bridged methodological gaps between geography, landscape ecology, and environmental science, uniting these related fields to design holistic solutions to many environmental, ecological, and climatic issues. Throughout his research career, Weng has authored 249 articles (journal articles, chapters, etc.) and 14 books. According to Google Scholar, as of November 2020, he has been cited more than 21,000 times (H-index of 66). Weng's research has been supported by funding agencies including the NSF, NASA, USGS, USAID, NOAA, National Geographic Society, and Microsoft.

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